

Notice of Allowability**Application No.**

10/591,581

Applicant(s)

UDAGAWA, TAKASHI

Examiner

HRAJR SAYADIAN

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 6-9-2011.
2. ☒ The allowed claim(s) is/are 1-6 and 8-15.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 7/29/2010
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 6/8/2011.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other See Continuation Sheet.

Continuation of Attachment(s) 9. Other: 6-1-2011 email and authorized amendment to claim 1.

DETAILED OFFICE ACTION ACCOMPANYING ALLOWANCE

Rejoinder of Restricted Inventions in View of Allowance

1. Claims 1-6 and 8-15 are allowable.

Claims 12, 14, and 15, previously withdrawn from consideration because of a restriction requirement, require all the limitations of allowable claim 1. Pursuant to the procedures set forth in M.P.E.P. § 821.04(a), therefore the restriction requirement between inventions generically depending from claim 1 are hereby withdrawn and claims 12, 14, and 15 are hereby rejoined and fully examined for patentability under 37 CFR 1.104.

In view of the withdrawal of the restriction requirement, Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also M.P.E.P. § 804.01.

Examiner's Amendment

2. An Examiner's Amendment to the record appears below. Should the changes or deletions or additions, be unacceptable to Applicant, an amendment may be filed as provided by 37 CFR § 1.312. **To ensure consideration of such an amendment, such an amendment MUST be submitted not later than the payment of the issue fee.**

3. In a telephonic interview on 6/9/2011, followed by an e-mail on 6/9/2011, a copy of which is attached, Mr. Rosner, Applicant's representative, authorized the following amendment to claim 1:

A. Claim 1 is amended by Examiner's Amendment to be:

1. (Amended by Examiner's Amendment): A boron phosphide-based semiconductor light-emitting device comprising:

a substrate of silicon single crystal;

a first cubic boron phosphide-based semiconductor layer that is provided on a surface of the substrate and contains twins;

a light-emitting layer that is composed of a hexagonal Group III nitride semiconductor and provided on the first cubic boron phosphide-based semiconductor layer, said light-emitting layer having a multi-quantum well structure comprising a plurality of well layers; and

a second cubic boron phosphide-based semiconductor layer that is provided on the light-emitting layer, contains twins and has a conduction type different from that of the first cubic boron phosphide-based semiconductor layer,

wherein the light-emitting layer has a profile of phosphorus atom concentration that [[gradually]] monotonically decreases from a bottom to a top thereof in a thickness direction such that the phosphorus atom concentration among the plurality of well layers is highest for the well layer closest to the substrate and is lowest for the well layer farthest from the substrate, and

a phosphorus atom concentration at a bottom of the light-emitting layer is $5 \times 10^{18} \text{ cm}^{-3}$ to $2 \times 10^{20} \text{ cm}^{-3}$.

4. Amended claim 1 has support at least by way of [0057]-[0058], which show the phosphorus concentration monotonically decreasing in the wells from the one closest to the substrate to the one farthest from the substrate.

Examiner's Statement of Reasons for Allowance

5. The following is Examiner's Statement of Reasons for Allowance:

Independent claim 1 is allowed over the prior art because the prior art neither anticipates nor renders obvious (in the context of claim 1):

" wherein the light-emitting layer has a profile of phosphorus atom concentration that [[gradually]] monotonically decreases from a bottom to a top thereof in a thickness direction such that the phosphorus atom concentration among the plurality of well layers is highest for the well layer closest to the substrate and is lowest for the well layer farthest from the substrate, and

a phosphorus atom concentration at a bottom of the light-emitting layer is $5 \times 10^{18} \text{ cm}^{-3}$ to $2 \times 10^{20} \text{ cm}^{-3}$."

Although various prior art references disclose several of the limitations in claim 1, these references and their combination fail to disclose the above identified limitations(s).

CONCLUSION

6. Any comments considered necessary by Applicant must be submitted not later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from an Examiner should be directed to Examiner Hrayr A. Sayadian, at (571) 272-7779, on Monday through Friday, 7:30 am – 4:00 pm ET.

If attempts to reach Mr. Sayadian by telephone are unsuccessful, his supervisor, Supervisory Primary Examiner Wael Fahmy, can be reached at (571) 272-1705. The fax

Art Unit: 2814

phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available only through Private PAIR. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. The Electronic Business Center (EBC) at (866) 217-9197 (toll-free) may answer questions on how to access the Private PAIR system.

/Hrayr A. Sayadian/

Primary Examiner, Art Unit 2814

1-571-272-7779